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(54) **UNIVERSAL INTERFACE FOR RETRIEVAL OF INFORMATION IN A COMPUTER SYSTEM**

(75) Inventors: **Yan Arrouye**, Cupertino, CA (US);
Keith Mortensen, Sunnyvale, CA (US)

(73) Assignee: **Apple Computer, Inc.**, Cupertino, CA (US)

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(56) **References Cited**

U.S. PATENT DOCUMENTS

5,404,295	A	*	4/1995	Katz et al.	707/2
5,727,129	A		3/1998	Barrett et al.	
5,729,741	A	*	3/1998	Liaguno et al.	707/104
5,764,906	A		6/1998	Edelstein et al.	
5,870,755	A	*	2/1999	Stevens et al.	707/104
5,893,107	A		4/1999	Chan et al.	
5,913,205	A	*	6/1999	Jain et al.	707/2
5,987,446	A	*	11/1999	Corey et al.	707/3
6,009,422	A	*	12/1999	Ciccarelli	707/4
6,285,785	B1	*	9/2001	Bellegarda et al.	382/187
6,311,178	B1	*	10/2001	Bi et al.	707/3
6,628,305	B1	*	9/2003	Hong et al.	345/734
6,732,088	B1	*	5/2004	Glance	707/3
2002/0107872	A1	*	8/2002	Hudis et al.	707/104.1

OTHER PUBLICATIONS

Chaudhuri et al "Optimizing queries over multimedia repositories", ACM 1996 pp. 91-102.*

Katayama et al "A universal query interface for heterogeneous distributed digital libraries", IEEE 1996, pp. 332-339.*

Menczer et al, "Adaptive information agents in distributed textual environments" Autonomous Agents 1998, Minneapolis MN, USA, pp. 157-164.*

Das et al, "Experiments in using agent-based retrieval from distributed and heterogeneous databases", IEEE 1997, pp. 27-35.*

Domenig et al, "An overview and classification of mediated query systems", ACM SIGMOD Record, vol. 28, No. 3, Sep. 1999, pp. 63-72.*

Pastor et al, "An architecture for intelligent resource agents", IEEE 1997, pp. 151-159.*

Jim Gray "Parallel database systems 101", ACM 1995, p. 436.*

Gary Perlman, "The FirstSearch user interface architecture: universal access for any user, in many languages, on any platform", ACM 2000, pp. 1-8.*

Dadoun et al, "Parallel processing for efficient subdivision search", ACM 1987, pp. 205-254.*

Wei Hong, "Exploiting inter-operation parallelism in XPRS", ACM 1992, pp. 19-28.*

Ganguly et al, "Efficient and accurate cost models for parallel query optimization", ACM 1996, pp. 172-181.*

Blumenfeld et al, "A uniform interface to networked library services", ACM 1992, pp. 608-613.*

Agosti et al, "Design of OPAC database to permit different subject searching accesses in a multi-disciplines universities library catalogue database", ACM 1992, pp. 245-255.*

* cited by examiner

Primary Examiner—Uyen Le

(74) *Attorney, Agent, or Firm*—Burns, Doane, Swecker & Mathis, L.L.P.

(57) **ABSTRACT**

The present invention provides convenient access to items of information that are related to various descriptors input by a user, by means of a unitary interface which is capable of accessing information in a variety of locations, through a number of different techniques. Using a plurality of heuristic algorithms to operate upon information descriptors input by the user, the present invention locates and displays candidate items of information for selection and/or retrieval. Thus, the advantages of a search engine can be exploited, while listing only relevant object candidate items of information.

49 Claims, 3 Drawing Sheets

